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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/618,591	07/15/2003	Masashi Takada	31869-190915	6874

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EXAMINER	
BRINEY III, WALTER F	

ART UNIT	PAPER NUMBER
2644	

DATE MAILED: 11/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/618,591	TAKADA, MASASHI	
	Examiner	Art Unit	
	Walter F Briney III	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 10-13* is/are rejected.

7)☒ Claim(s) *8,9 and 14-17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/15/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. **Claims 1-3, 6, and 10-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Basburg-Ertem et al. (US Patent Application Publication 2002/0041678).**

Claim 1 is limited to *an echo canceller*. Basburg-Ertem discloses a method and apparatus for integrated echo cancellation and noise reduction for fixed subscriber terminals. See Abstract. Figure 6 depicts the preferred embodiment of Basburg-Ertem. Clearly, the device includes all the standard elements of an adaptive echo canceller, which filters a far-end signal and subtracts it from a near-end signal to remove echo (i.e. *using an adaptive filter to generate an echo replica signal from a received far-end signal and using the echo replica signal to cancel an echo component in a near-end signal, thereby generating a transmit signal*). The echo canceller depicted in figure 6 contains two voice activity detection units. The first is located within the Encoder (18) (i.e. *a double-talk detector for detecting at least a double-talk state*) and the second within the secondary double-talk detector (70) (i.e. *an echo path change detector for estimating an echo path loss on an echo path by which the echo component reaches the transmitted near-end signal from the received far-end signal thereby detecting echo path change*).

Both devices are operable to declare double-talk, causing the adaptive filter to stop updating its coefficients (i.e. *a control unit for controlling adaptation in the adaptive filter according to detection of the double-talk state by the double-talk detector and detection of echo path change by the echo path change detector*). See paragraphs 51-57. Therefore, Basburg-Ertem anticipates all limitations of the claim.

Claim 2 is limited to *the echo canceller of claim 1*, as covered by Basburg-Ertem. The adaptive filter (78) inherently updates as the echo path changes, and during the initial non-convergent phases. The adaptive control is actually controlled separately by the two talk detectors. Before initial convergence, the secondary double-talk detector controls all adaptation. Afterward, the encoder's (18) VAD algorithm provides adaptation control. See paragraph 51. This means that the coefficients are updated if the secondary double-talk detector doesn't detect change during the non-convergent state, but are not updated when the secondary double-talk detector does detect change during the non-convergent state. The state of the encoder's VAD is not of any concern at this time, thus it can indicate any state. Therefore, Basburg-Ertem anticipates all limitations of the claim.

Claim 3 is limited to *the echo canceller of claim 1*, as covered by Basburg-Ertem. The filter of Basburg-Ertem operates in the conventional manner, such that an echo replica is generated from the received far-end (i.e. *wherein the adaptive filter generates the echo replica signal from the received far-end signal*) and subsequently removed from the near-end signal. The filter updates according to the error signal that results (i.e. *and adapts to changes in the echo path according to the received far-end signal*

and the transmit signal). Note, the error signal corresponds to the *transmit signal*, and is a function of the received far-end signal. Therefore, Basburg-Ertem anticipates all limitations of the claim.

Claim 6 is limited to *the echo canceller of claim 1*, as covered by Basburg-Ertem. The secondary double-talk detector is described thoroughly in section 1, double talk detection, in particular paragraphs 52-56. A metric $[s(n) + y(n)] / \max\{x(n),\ldots,x(n-N)\}$ is calculated and compared to ERL_{est}. See equation 6. Clearly, the equation suggests that the secondary double-talk detector includes level detectors for both received and transmitted signals, as well as a comparator for judging the measured ERL against the ERL_{est}. The value ERL_{est} corresponds to a long-term average of obtained ERL, as described in equation 7. Double-talk/path change is detected in accordance with figure 6. Therefore, Basburg-Ertem anticipates all limitations of the claim.

The method steps of claims 10 and 11 are inherently performed by the echo canceller defined in claims 2 and 6, respectively, and are rejected for the same reasons.

Claim 12 is limited to *the method of claim 11*, as covered by Basburg-Ertem. Because the secondary double-talk detector is the active detector during the initial non-convergent state, equation 7 is the only thing needed to be determined for detection of echo path change (i.e. *wherein said one necessary condition is the only necessary condition for the detection of said echo path change in the double-talk state*). Therefore, Basburg-Ertem anticipates all limitations of the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Basburg-Ertem in view of Duttweiler et al. (US Patent Application Publication 2002/0057790) and Braught (http://www.dickinson.edu/~braught/courses/cs251f99/classes/notes18.html).

Claim 4 is limited to *the echo canceller of claim 3*, as covered by Basburg-Ertem. With respect to the rejection of claim 5, Basburg-Ertem in view of Duttweiler makes obvious at least a single switch controlled by either of the VAD within the encoder or the secondary double-talk detector. Therefore, Basburg-Ertem in view of Duttweiler makes obvious all limitations of the claim with the exception *wherein the control unit comprises: a first switch controlled by the double-talk detector and a second switch controlled by the echo path change detector.*

Because two distinct devices are responsible for controlling a single switch, one of ordinary skill in the art would be required to adapt the switch to two inputs. The examiner takes Official Notice of the fact that logical OR gates were well known in the art at the time of the invention and provide a convenient and easy method to implement shared control over a single element. Furthermore, the basic structure of a two-input OR gate is understood to include at least two gates for each input (i.e. two switches). As further evidence, consider the lecture notes published by Braught. Braught teaches a CMOS OR gate comprising four switches, two in a pull-up network and two in a pull-

down network. One gate in each network is controlled by one of the inputs. See figure 6. It would have been obvious to one of ordinary skill in the art at the time of the invention to control the update switch taught by Duttweiler with an OR-gate as is known in the art that includes a pair of switches for each input for the purpose of allowing two separate outputs control over the update switch as is necessitated by the design of Basburg-Ertem.

3. **Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Basburg-Ertem in view of Duttweiler.**

Claim 5 is limited to *the echo canceller of claim 3*, as covered by Basburg-Ertem. As shown in the rejection of claims 1-3, Basburg-Ertem discloses disabling the update of the adaptive echo canceller's coefficients during a double-talk state. One of a VAD located within the encoder (18) and a secondary double-talk detector (70) is responsible for detecting the double-talk state. It is noted that Basburg-Ertem does not disclose how the adaptive process is disabled. Therefore, Basburg-Ertem anticipates all limitations of the claim with the exception *wherein the control unit comprises: a switch controlled by the double-talk detector and the echo path change detector.*

It is submitted that one of ordinary skill in the art would be required to select some type of hardware or software control scheme to prevent adaptation. Duttweiler teaches an echo canceller that is used in a network for data applications. See Abstract and figure 2. In summary, like Basburg-Ertem, which disables coefficient updates during double-talk, Duttweiler disables adaptation of the echo canceller during certain operating states. This disablement is achieved by signaling to a switch (240) that a

disabled state has been reached, thus preventing a calculated error signal from being supplied to the adaptive filter. See paragraph 18. It would have been obvious to one of ordinary skill in the art at the time of the invention to prevent adaptation by way of a switch as taught by Duttweiler for the purpose of allowing the echo canceller disclosed by Basburg-Ertem to effectively disable coefficient updating upon detection of a true double-talk state by either the VAD of the encoder or the secondary double-talk detector.

4. **Claims 7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Basburg-Ertem in view of Hemkumar (US Patent 6,434,110).**

Claim 7 is limited to *the echo canceller of claim 6*, as covered by Basburg-Ertem. Basburg-Ertem does not disclose any further means of differentiating between double-talk and echo path change. Therefore, Basburg-Ertem anticipates all limitations of the claim with the exception *wherein the echo path change detector further comprises a counter for counting a number of consecutive time intervals during which the double-talk state is detected.*

Hemkumar discloses a full-duplex speakerphone circuit including a double-talk detector. See Abstract. Of most importance is that Hemkumar teaches an adaptive echo canceller that measures the duration of a double-talk signal. This detection is initially used to disable filter updates, but after lingering for a predetermined amount of time, triggers a new round of updating. See column 19, line 56 to column 20, line 26l. Hence, a long bout of double-talk detection suggests an echo path change (i.e. *another necessary condition for the detection of said echo path change being that a count value*

of the counter is equal to or greater than a predetermined threshold count value). See figure 6B, in particular, steps 646-650. It would have been obvious to one of ordinary skill in the art at the time of the invention to include the double-talk timer that restarts adaptation after a significant echo path change as taught by Hemkumar for the purpose of providing a more robust double-talk detector than that disclosed by Basburg-Ertem.

The method of claim 13 is inherently performed by the echo canceller of claim 7, and is rejected for the same reasons.

Allowable Subject Matter

5. **Claims 8, 9, and 14-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.**

Claim 8 is limited to *the echo canceller of claim 6*, as covered by Basburg-Ertem. Basburg-Ertem discloses using a VAD in place of an ERL detector for detecting near-end speech. See paragraphs 48-51. Removing the VAD would disrupt many of the finely tuned principles of the invention, and appears to teach away from the invention disclosed by Basburg-Ertem. For example, the VAD is more noise-tolerant than the ERL detector. However, in a low-noise situation the VAD becomes unstable and is replaced with the secondary double-talk detector. If one were to replace the VAD with the ERL detector, there would be no detector finely tuned for high-noise situations. Therefore, Basburg-Ertem anticipates all limitations of the claim with the exception

wherein the echo path change detector further comprises an echo path loss tolerance calculator. Thus, claim 8 is allowable over Basburg-Ertem.

Claim 9 is dependent on claim 8, and is allowable over Basburg-Ertem for the same reasons.

Claim 14 is directed to the echo canceller of claim 8, wherein the calculated ERL is further compared to a predetermined threshold as another detection condition. Thus, claim 14 is allowable over Basburg-Ertem for the same reasons as claim 8.

Claims 15-17 are dependent on claim 14, and are allowable for the same reasons.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter F Briney III whose telephone number is 703-305-0347. The examiner can normally be reached on M-F 8am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W Isen can be reached on 703-305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

WFB
10/26/04

XU MEI
PRIMARY EXAMINER